

**REMARKS**

**I. INTRODUCTION**

Applicants thank the Examiner for the indication that claims 14, 15, 19-22, 40, 41, 46, 47, 60-64, 72-74, 89, 90, 94-102 and 125-127 include allowable subject matter.

Claim 137 has been amended above to remove a minor informality, and in no way to address any rejection. In particular, this claim has been amended merely to include a period at the end thereof. New claims 138-142 have been added. Accordingly, claims 1-142 are now under consideration in the above-referenced application. Provided above, please find a claim listing indicating the current amendment to the previously-pending claim 137 and the new claims so as to comply with the requirements set forth in 37 C.F.R. § 1.121. It is respectfully submitted that no new matter has been added.

**II. REJECTION UNDER 35 U.S.C. § 103(a) SHOULD BE WITHDRAWN**

Claims 1-13, 16-18, 23-39, 42-45, 48-59, 65-71, 75-88, 91-93, 103-124 and 128-137 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,516,209 issued to Chang et al. (the "Chang Patent"). It is respectfully asserted that the Chang Patent fails to teach or suggest the subject matter recited in independent claims 1, 33, 49, 65, 75, 108, 128 and 133 of the above-referenced application, and the claims which depend therefrom. In addition, Applicants reserve the right to antedate the Chang Patent at any point during the prosecution of the above-identified application or any application which claims priority therefrom.

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103, not only must the prior art teach or suggest each element of the claim, the prior art must also suggest combining the elements in the manner contemplated by the claim. *See Northern Telecom, Inc. v.*

*Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir.), *cert. denied* 111 S.Ct. 296 (1990); *see In re Bond*, 910 F.2d 831, 834 (Fed. Cir. 1990). "It is improper to use the inventor's disclosure as a road map for selecting and combining prior art disclosures." *See Grain Processing Corp. v. American Maize-Products Corp.*, 840 F.2d 902, 907 (Fed. Cir. 1988). "[T]he reference must be viewed without the benefit of hindsight afforded to the disclosure." *In re Paulsen*, 30 F.3d 1475, 1482 (Fed.Cir. 1994). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *See In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

A. Rejection of Claims 1-13, 16-18, 23-33, 49-59,  
75-88, 91-93, 103-107 and 128-137 Should be Withdrawn

Applicants' invention, as recited in independent claim 1, relates to a method of determining a distribution of one or more properties in a medium illuminated with radiation from one or more sources, which comprises the steps of, *inter alia*:

- a. receiving the radiation exiting the medium;
- b. **deriving one or more optical properties of the medium using one or more calibration factors and the radiation received in step (a), wherein the calibration factors are variables**; and
- c. **determining the distribution in the medium using the one or more optical properties derived in step (b).**

Independent claims 49, 75, 128 and 133 relate to computer readable medium, system, software system, and another system, respectively, which recite similar subject matter.

The Chang Patent relates to a self-calibrating optical imaging system for providing two- or three-dimensional images of spatial or temporal distribution of chromophores or their properties in a physiological medium, and whose operation is based on wave equations such as the Beer-Lambert equation, modified Beer-Lambert equation, photon diffusion equation, and their

referenced claims. Then, the Examiner contends that because the baseline is unknown before the measurement, it is variable. Even if, *arguendo*, the baseline of the Chang Patent can be compared to the one or more calibration factors recited in these claims, it is respectfully asserted that such baseline *is not variable*.

First, this term as it is known in the mathematical arts means something that has “no quantitative value” or “varies or is prone to variation.” (See Webster’ II New College Dictionary 1995, p.1220, copy enclosed). Clearly, the baseline of the Chang Patent does not fit this definition. This is at least because the system of the Chang Patent calculates the value of the baseline from the output signal, which corresponds to the amplitude(s) of portions of such signal. Indeed, the baseline described in the Chang Patent in no way varies or is prone to variation, since such variance would be contrary to the intention for use of such values, i.e., to be used as an exact threshold.

Second, Applicants understand that values which may be assigned to the baseline before the usable value therefore is calculated by the system of the Chang Patent are possibly unknown. However, Applicants believe that the Chang Patent’s system, *during the self-calibration and generation of calibrated signal*, uses the exact values of the manipulated baseline. Thus, at the time, such baseline values are not variable, and instead exact. Although the Chang Patent states that that the baseline can be manipulated, it is silent as to whether the manipulation is performed during, after or before the derivation or performance of the self-calibration.

In addition, Applicants respectfully submit that the Chang Patent also does not teach or suggest the derivation of **one or more optical properties of the medium**, and the **determination of the distribution in the medium using the one or more optical properties** and as recited in these claims. The system of the Chang Patent obtains the self-calibrated output signal representing a

equivalents. (See Change Patent, column 1, lines 18-22; and column 2, lines 18-25). In particular, the system of the Chang Patent includes a wave source which irradiates electromagnetic waves into the target areas of the medium, and a wave detector which detects electromagnetic waves from the target areas and to generate output signal in response thereto. (See *id.*, column 2, lines 29-34).

The system of the Change Patent further includes a signal analyzer which receives, from the wave detector, a first output signal which is representative of the distribution of the chromophores or their properties in a first target area of the medium. (See *id.*, column 2, lines 37-40). A signal analyzer of this system then analyzes an amplitude of each point of the first output signal, and selects one or more points or portions of the first output signal having substantially similar first amplitudes. A signal processor of the system calculates a first baseline from the first output signal, where the first baseline corresponds to a representative amplitude of the first amplitudes of such points or portions, and provides a self-calibrated first output signal by manipulating the first output signal and first baseline thereof. In this manner, the system of the Chang Patent provides the self-calibrated output signal representing a spatial distribution and/or temporal variation of the chromophores or their properties in the first target area. (See *id.*, col. 2, lines 40-52)

As an initial matter, Applicants respectfully assert that the Chang Patent in no way teaches or suggests that **one or more optical properties of the medium are derived using one or more calibration factors which are variable**, as explicitly recited in independent claims 1, 49, 75, 128 and 133. In the Office Action, the Examiner apparently equates the baseline (calculated by the system of the Chang Patent from the output signal generated in response to the electromagnetic waves received from the target area) to one or more calibration factors recited in the above-

spatial distribution and/or temporal variation of the *chromophores* or their properties in the first target area. (See Chang Patent, col. 2, lines 40-52, *emphasis added*). The term “chromophore” is defined as “a chemical group capable of selective light absorption resulting in the coloration of certain organic compounds.” (See American Heritage Dictionary of the English Language, Fourth Edition, 2000). Thus, such system of the Chang Patent obtains the distribution of the chemical group in the target area based on the baseline (equated by the Examiner to Applicants’ claimed one or more calibration factors), but does not determine such distribution based on one or more properties (which are different from such calibration factors). In addition, the Chang Patent nowhere mentions, much less teaches or suggests of any “optical property” being usable for the determination of the distribution of the medium.

Therefore, Applicants respectfully submit that because the Examiner has not established a *prima facie* case of obviousness for claims, the 35 U.S.C. § 103(a) rejection of claims 1, 49, 75, 128 and 133 is improper, and should be withdrawn. Other claims which depend from such independent claims 1, 49, 75, 128 and 133 are also allowable over the Chang Patent for at least the same reasons, as well as contain separately patentable subject matter.

B. Rejection of Claims 33-39, 42-45, 48-59, 65-71 and 108-124 Should be Withdrawn

Applicants’ invention, as recited in independent claim 33, relates to a method of measuring a distribution of at least one property within a medium, which comprises the steps of, *inter alia*:

- ...
- d. **calculating the distribution of the at least one property based on the at least one measured parameter by including source and detector calibration factors as freely varying quantities that are reconstructed in a model for a radiative transport within the medium.**

Independent claims 65 and 108 relate to computer readable medium and system, respectively, which recite similar subject matter.

Applicants respectfully assert that the Chang Patent fails to teach or suggest that **the distribution of the at least one property is calculated based on the at least one measured parameter by including source and detector calibration factors as freely varying quantities**, as recited in independent claims 33, 65 and 108. The reasons for this belief are substantially the same as those provided above with reference to independent claims 1, 49, 75, 128 and 133 with respect to the recitations of one or more calibration factors and use thereof to derive properties which are used determine the distribution of the medium.

In addition, it is respectfully submitted that the Chang Patent also does not teach or suggest that source and detector calibration factors are freely varying quantities that are reconstructed in a model for a radiative transport within the medium. First, Applicants disagree that one having ordinary skill in the art would understand the calibration factors to include “source and detector” calibration factors (the disclosure of which is also lacking in the Chang Patent). No other prior art reference was relied on by the Examiner in support of this belief. Second, there is absolutely no disclosure in the Chang Patent that the baseline (equated by the Examiner to one or more calibration factors) is reconstructed in any model, much less in the model for a radiative transport within the medium.

Therefore, Applicants respectfully submit that because the Examiner has not established a *prima facie* case of obviousness for claims, the 35 U.S.C. § 103(a) rejection of claims 33, 65 and 108 is improper, and should be withdrawn. Other claims which depend from such

independent claims 33, 65 and 108 are also allowable over the Chang Patent for at least the same reasons, as well as contain separately patentable subject matter.

C. Summary

Accordingly, Applicants respectfully assert that claims 1-13, 16-18, 23-39, 42-45, 48-59, 65-71, 75-88, 91-93, 103-124 and 128-137 are allowable over the Chang Patent, and the 35 U.S.C. § 103(a) rejections of these claims should be withdrawn.

**III. ALLOWABLE SUBJECT MATTER AND NEW CLAIMS 138-142**

Applicants thank the Examiner for the indication that claims 14, 15, 19-22, 40, 41, 46, 47, 60-64, 72-74, 89, 90, 94-102 and 125-127 include allowable subject matter.

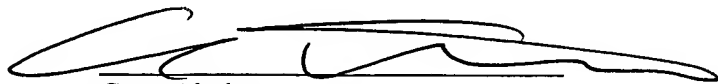
In addition, claims 138-142 have been added above to depend from independent claims 1, 49, 75, 128 and 133. Accordingly, these new claims are believed to be allowable for at least the same reasons as provided above for claims 1, 49, 75, 128 and 133. Also, the new claims recite certain subject matter that the Examiner indicated as being allowable over the art of record. (See Office Action, page 3, paragraph 3). Therefore, Applicants respectfully request a confirmation that these new claims are allowable.

IV. CONCLUSION

In light of the foregoing, Applicants respectfully submit that pending claims 1-142 are in condition for allowance. Prompt consideration, reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

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